

## Power quality and energy tools selection guide

Basic measurements	Application use	Single-Phase			Three-Phase					
		VR1710	345	43B	1730	1736/38	1740	430-II	1750	1760
<b>Energy studies</b>										
Measure V, I, kW, Cos/DPF, kWhr	Get detailed power and energy consumption profiles during energy audits and pinpoint savings opportunities		•	•	•	•	•	•	•	•
Measure MIN/MAX and AVG values			•	•	•	•	•	•	•	•
10 day logging			•	•	•	•	•	•	•	•
Waste energy monetization							•			
<b>Basic harmonics study</b>										
THD measurement (V & I)	Discover the source of distortion in your installation, so that you can filter those loads or move them to separate circuits	•	•	•	•	•	•	•	•	•
Harmonics 1 to 25 for V & I		• (V only)	•	•		•	•	•	•	•
<b>Advanced harmonics study</b>										
Full harmonic spectrum	If distorting loads are causing problems in your installation, you need comprehensive data to identify the source and create a solution		•	•		•	•	•	•	•
Power harmonics			•	•				•	•	•
<b>Basic industrial PQ troubleshooting</b>										
Oscilloscope function	When troubleshooting in the field, graphical data enables you to trace the source of the problem at hand		•	•		•		•	•	•
Voltage dips and swells		•		•		•	•	•	•	•
<b>Advanced industrial PQ troubleshooting</b>										
Comprehensive logging capability	Complex installations often require a deeper dive into measurement data. Multiple loads may be interacting randomly to cause a single problem		•	•		•	•	•	•	•
Transient capture		•		•		•		•	•	•
Flicker		•					•	•	•	•
<b>Motor analysis</b>										
Speed	Perform dynamic motor analysis by plotting of motor de-rating factor against load according to NEMA/IEC guidelines on direct on-line electric motors							•		
Torque								•		
Mechanical power								•		
Efficiency								•		
<b>Features</b>										
Inrush						•		•		
Flicker								•	•	•
Transients								•	•	•
Mains signaling								•	•	•
Power wave								•		
Event waveform capture						•		•	•	•
400 Hz								•		
Power inverter efficiency								•		

Find how-to videos, application notes and other resources on the power quality and power and energy loggers product pages on [www.fluke.com](http://www.fluke.com)

# POWER QUALITY AND ENERGY TOOLS



## Fluke 430-II Series Three-Phase Power Quality and Motor Analyzers

### Locate, predict, prevent power quality problems

The Fluke 434-II, 435-II, 437-II and 438-II help troubleshoot power quality problems in three- and single-phase power distribution systems. The Fluke patented energy loss algorithm, Unified Power Measurement, measures, quantifies and monetizes energy losses due to harmonics and unbalance issues, allowing the user to pinpoint the origin of energy waste within a system.

- Capture fast rms data in real time with PowerWave data capture; show single cycle rms value to characterize electrical system dynamics (generator start-ups, UPS switching etc.)
- Measure key parameters on direct-on-line motors including torque, RPM, mechanical power and motor efficiency (438-II, or with 430-II/MA upgrade option)
- CAT IV 600 V/CAT III 1000 V rated for use at the service entrance
- Automatic transient mode; capture 200 kHz waveform data on all phases simultaneously up to 6 kV for 435-II and 437-II
- Conduct tests according to the stringent international IEC 61000-4-30 Class-A standard intervals for 435-II and 437-II
- With included four iFlex flexible current probes, measure all three phases and neutral
- Download data wirelessly with the Fluke Connect® SD Card (not included with the INTL)
- Three-year warranty



ENERGY LOSS CALCULATOR			
Due to Load Current	Loss	Cost/yr	Cost/1000kWh
Effective	323 kJ	748 U	905
Reactive	164 kvar	193 U	105
Unbalance	170 kVA	190 U	105
Distortion	595 kVA	2.52 kJ	1869
Neutral	51.7 kA	3.08 U	6.225
Line loss	3.65 kJ	2708	

### Ordering information

Models	Included accessories
FLUKE-434-II Three-Phase Energy Analyzer	
FLUKE-435-II Three-Phase Power Quality and Energy Analyzer	Four thin flexible current probes, five test leads and clips, battery charger, Power Log software, USB cable, color localization set, soft carrying case, 8GB WiFi SD memory card, users manual on CD
Fluke-438-II Three-Phase Power Quality and Motor Analyzer	
FLUKE-437-II 400 Hz Three-Phase Power Quality and Energy Analyzer	Four thin flexible current probes, five test leads and clips, battery charger, Power Log software, USB cable, color localization set, hard carrying case with wheels, 8GB WiFi SD memory card, users manual on CD
Fluke-430-II/MA 430-II Motor Analyzer Upgrade Kit	Firmware license code

## Fluke 1730 Three-Phase Electrical Energy Logger

### Find sources of energy waste

The Fluke 1730 Three-Phase Electrical Energy Logger introduces a new simplicity to discovering sources of electrical energy waste. Profiling energy usage across your facility helps you identify opportunities for energy savings and provides you with the easy-to-understand data. The Fluke 1730 Energy Logger can be used for conducting energy surveys that require both a voltage and current connection. Load studies that require a current connection only for evaluating electrical demand capacity can also be performed.

- Quickly understand specific points of energy loss, reduce energy bills more easily than ever
- Optimized layout with specialized touch screen makes navigation easy—even with gloves on
- Advanced auto-correct feature eliminates costly errors due to improper connections
- Power directly from the measured voltage line (up to 500 V) or with conventional ac power cord

### Ordering information

Models	Included accessories
1730/BASIC Three-Phase Electrical Energy Logger (excludes current probes)	Power supply, voltage test lead, dolphin clip, i1730-flex 1500 iFlex Flexible Current Probes, color-coded wire clips, power cord, test lead set with stackable plugs, dc power cable(s), USB cable A, mini USB, soft storage bag, input connector decal, information packet. Software included
1730/US Portable Energy Logger US version	Software included (FEA, Fluke Energy Analyze)
1730/EU Portable Energy Logger EU version	
1730/INTL Portable Energy Logger INTL version	
FLUKE-1735 Three-Phase Power Logger	Four flexible current probes (15 A/150 A/3000 A), Power Log software, voltage leads and clips, color localization set, PC interface cable, international ac adapter (115 V/230 V, 50 Hz/60 Hz), soft carrying case, users manual, multi-language manual on CD



## Fluke 1736 and 1738 Three-Phase Power Loggers

### More visibility, reduced uncertainty and better power quality and energy consumption decisions

The Fluke 1736 and 1738 Three-Phase Power Loggers built with Fluke Connect® mobile app and desktop software compatibility give you the data you need to make critical power quality and energy decisions in real-time. The ideal test tools for conducting energy studies and basic power quality logging, the 1736 and 1738 automatically capture and log over 500 power quality parameters so you have more visibility into the data you need to optimize system reliability and savings.

- **Measure all three phases and neutral** with included four flexible current probes.
- **Comprehensive logging:** More than 20 separate logging sessions can be stored on the instruments. In fact, all measured values are automatically logged so you never lose measurement trends.
- **Capture dips, swells, and inrush currents:** includes event waveform (1738 only) snapshot and high resolution RMS profile, along with date, timestamp and severity to help pinpoint potential root causes of power quality issues.
- **Optimized user interface:** Capture the right data every time with quick, guided, graphical setup and reduce uncertainty about your connections with the intelligent verification function.
- **Fluke Connect® Compatible:** View data locally on the instrument, via Fluke Connect mobile app and desktop software or through your facilities' WiFi infrastructure



### Specifications

Accuracy				
Parameter	Range	Resolution	Intrinsic accuracy at reference conditions (% of reading + % of full scale)	
<b>Voltage</b>	1000 V	0.1 V	± (0.2 % + 0.01 %)	
<b>Current:</b> Direct input	i17xx-flex 1500 12"	150 A	0.1 A	± (1 % + 0.02 %)
		1500 A	1 A	± (1 % + 0.02 %)
	i17xx-flex 3000 24"	300 A	1 A	± (1 % + 0.03 %)
		3000 A	10 A	± (1 % + 0.03 %)
	i17xx-flex 6000 36"	600 A	1 A	± (1.5 % + 0.03 %)
		6000 A	10 A	± (1.5 % + 0.03 %)
	i40s-EL clamp	4 A	1 mA	± (0.7 % + 0.02 %)
		40 A	10 mA	± (0.7 % + 0.02 %)
<b>Frequency</b>	42.5 Hz to 69 Hz	0.01 Hz	± (0.1 %)	
<b>Aux input</b>	± 10 V dc	0.1 mV	± (0.2 % + 0.02 %)	

<sup>1</sup>Range = 1000 V x I range

### Ordering information

Models	Included accessories
FLUKE-1736 Three-Phase Power Logger	Instrument, power supply, voltage test leads, alligator clips (4x), 12 in 1,500 A flexible current probe (4x), soft case, Energy Analyze Plus software, WiFi adapter**, line cords, color coding set and documentation on USB flash drive
FLUKE-1738 Three-Phase Power Logger	Instrument, power supply, voltage test leads, alligator clips (4x), 12 in 1,500 A flexible current probe (4x), soft case, Energy Analyze Plus software, magnetic hanging strap, magnetic voltage probes (4x), WiFi/BLE adapter**, line cords, color coding set and documentation on USB flash drive
FLUKE-1738/Upgrade	Magnetic hanging strap, magnetic voltage probes (4x), WiFi/BLE adapter, Firmware license: PQ Health, Wave form Event Capture

\*\*Not all models are available in all countries. Check with your local Fluke representative.



# POWER QUALITY AND ENERGY TOOLS



## Fluke 345 Power Quality Clamp Meter

### Troubleshoot modern electrical loads

The Fluke 345 is more than a power meter. Combining the functions of a clamp meter, oscilloscope, data logger and digital power meter into one handy device. The Fluke 345 is ideal for working with variable frequency motor drives, high efficiency lighting and other loads using switching electronics.

- Clamp-on measurement of ac current up to 1400 A rms and dc current up to 2000 A without breaking the circuit
- CAT IV 600 V power analyzer is rated for use at the service entrance
- Clamp meter performs even in noisy environments with distorted waveforms present on electronic loads with low-pass filter
- Identify intermittent faults by logging any power quality parameter for minutes, or over a month, including harmonics
- Analyze, log and troubleshoot harmonics digitally or graphically
- Capture and analyze inrush current and nuisance tripping from 3 seconds to 300 seconds
- View graphs and generate reports using power analyzer with included Power Log software



## Fluke 43B Power Quality Analyzer

### Measurements to maintain power systems

The Fluke 43B Power Quality Analyzer troubleshoots power problems and diagnoses equipment failures. The 43B has 20 storage locations and can store data as well as screens.

- Voltage, current and power harmonics up to 51st, THD
- View voltage and current waveforms with the oscilloscope function
- Capture up to 40 voltage transients and waveform events
- Cursors give time and date of sags and swells for detailed event capture
- Analysis and reporting with FlukeView® software, supplied with USB connection lead
- Three-year warranty for analyzer, one-year warranty for accessories



## Fluke VR1710 Power Quality Recorder

- Fast and easy recording of voltage trends, dropouts and power quality to easily pinpoint the root cause of single phase voltage problems
- Min, Max, and Average RMS values (1/4 cycle) with time stamp, transient display (>100 µs) with time stamp
- Identify problems with power quality or equipment related Flicker recording to EN 61000-4-15, individual harmonic and THD values with trends
- Includes PowerLog software for quick download, analysis and automatic reporting
- Generate power quality reports automatically with pre-set templates



### Ordering information

Models	Included accessories
FLUKE-345 Clamp-On Power Meter	Test leads, alligator clips, test probes, Power Log software, USB cable, international ac adapter/battery eliminator, soft carrying case, users manual, multi-language manual on CD
FLUKE-43B Power Quality Analyzer	Voltage and current probes, FlukeView® software, power quality instructional CD, USB interface cable, line voltage adapter/battery charger, hard case, users manual
FLUKE-VR1710 Voltage Quality Recorder	USB cable, Power Log software CD, universal power cord adapters

## Fluke Norma 4000 and 5000 Precision Power Analyzers

### For field and laboratory testing

Fluke Norma 4000 and 5000 Precision Power Analyzers offer easy and straight-forward operation with unmatched price performance. Features include: 1 to 6 power phases, 144 mm (5.7 in) color display, harmonic analysis, scope mode, vector diagram display, recorder function, Fluke NormaView PC software and 4MB RAM data memory.

- A variety of standard configurations allows users to choose the exact functionality required for their unique application
- Inputs are galvanically isolated to avoid short circuits in all applications, and simultaneous parallel acquisition of all phases allows for accurate viewing of dynamic events dc to 3 MHz/10 MHz bandwidth for reliable measurement precision
- Voltage, current and power harmonics FFT analysis to the 40th harmonic, vector diagram, and Digital Oscilloscope (DSO) mode included in the base unit
- PII process interface to measure torque and speed with external sensors, plus four analog outputs for easy use on motor and drive applications
- Data download, analysis and report writing with supplied Fluke NormaView PC software



Fluke Norma 4000



Fluke Norma 5000



Fluke 1745



Fluke 1744/1743

## Fluke 1740 Series Three-Phase PQ Loggers

### Instruments to troubleshoot and analyze power distribution

The Fluke 1740 Series Three-Phase Power Quality Loggers include PQ Log software to quickly assesses the quality of power at the service entrance, substation, or at the load, according to the latest EN50160 standard.

- Setup in minutes with automatic current probe detection and powering
- Compact, fully-insulated housing and accessories fit easily in tight spaces, next to live power
- Included PQ Log software analyzes trends, creates statistical summaries, and generates detailed graphs and tables
- IEC61000-4-30 Class-A compliant voltage accuracy (0.1 %)

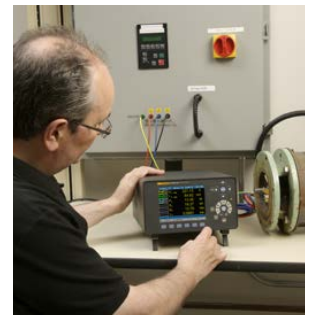
### Specifications

	1743/1744	1745	1750
Measures common power parameters: V, A, W, VA, VAR, PF, energy, flicker, voltage events, and THD	•	•	•
Measures voltage and current harmonics to the 50th, unbalance, and mains signaling	•	•	•
Transient capture			•
PDA support			•
UPS ride through	3s	> 5 hours	5 min per interruption, 60 min total
Dimensions	170 mm x 125 mm x 55 mm (6.9 in x 5.1 in x 2.2 in)	282 mm x 216 mm x 74 mm (11.5 in x 8.8 in x 3 in)	215 mm x 310 mm x 35 mm (8.5 in x 12.2 in x 3.5 in)
Weight (approx.)	0.9 kg (2 lb)	1.4 kg (3 lb)	6.3 kg (14 lb)

### Ordering information

Models	Included accessories
Norma 4000 High Precision Power Analyzer	Power supply cable, NormaView PC software, test certificate, calibration values, users manual
Norma 5000 High Precision Power Analyzer	
FLUKE-1745 Power Quality Logger – Memobox	Four flexible probes 15/150/1500/3000 A with 2 m cable, PQ Log software, RS-232 interface cable and USB adapter, four dolphin clips, test leads for voltages and power supply, color localization kit, carrying bag, test certificate with measurement values, users manual, multi-language manual CD
FLUKE-1744 Power Quality Logger – Memobox	
FLUKE-1743 Power Quality Logger – Memobox	

In the U.S., these power quality recorders are sold exclusively through power quality representatives. To request a demonstration, or to order, call 1-888-257-9897 or email questions to [fpqsupport@fluke.com](mailto:fpqsupport@fluke.com).



# POWER QUALITY AND ENERGY TOOLS



## Fluke 1750 Three-Phase Power Recorder

### Never miss capturing a disturbance

The Fluke 1750 Power Recorder and the Fluke Power Analyze software allows you to easily record three-phase power quality and monitor for power quality disturbances. These power meters automatically record every power quality parameter and event, on every cycle—all the time.

- All measurements comply with IEC61000-4-30 standards for correct evaluation of all measured values including voltage, current, power, harmonics, flicker etc.
- PDA wireless “front panel interface” provides a window into what the instrument is recording, enabling quick and reliable configuration even in awkward test locations
- Cross-channel and current triggering capture every measurement, on every channel, every time
- With intuitive PC software, easily analyze data and generate reports. Automated EN50160 reporting and compliance
- Voltage and current measurements on three phases, neutral and ground



## Fluke 1760 Three-Phase Power Quality Recorder

### Captures the most comprehensive details

The Fluke 1760 Three-Phase Power Quality Recorder is fully compliant to IEC 61000-4-30 Class-A, for advanced power quality analysis and consistent compliance testing. Designed for analysis of utility and industrial power distribution systems, in medium- and low-voltage networks, this power quality monitor provides the flexibility to customize thresholds, algorithms, and measurement selections.

- Use GPS time synchronization to correlate data with events or datasets from other instruments with precision
- Using flexible and fully configurable thresholds and scale factors, pinpoint specific issues by defining the detailed criteria for detection and recording of disturbances
- 10 MHz, 6000 Vpk waveform capture for a detailed picture of even the shortest event
- 2GB data memory enables detailed, simultaneous recording of numerous power parameters for long periods of time
- Comprehensive software provides trend diagrams for root cause analysis, statistical summaries, report writing and real-time data monitoring in the online mode
- Quick setup with automatic sensor detection; sensors are instrument powered, eliminating the need for batteries

### Specifications

	1760TR	1760	1760TR BASIC	1760 BASIC
Online mode (oscilloscope, transients and events)	•	•	•	•
Fast transient analysis up to 10 MHz	•		•	
Four 600 V voltage probes	•	•		
Four dual-range flexible current probes (1000 A/200 A ac)	•	•		
GPS time sync receiver	•	•		

### Ordering information

Models	Included accessories
FLUKE-1750 Three-Phase Power Recorder Kit	Acquisition unit, PDA and charger, power plug adapters, 4 x 400 A 3140-PR current probes (1750 only), 4 x 1000 A 3210-PR-TF iFlex current probes (1750-TF only), five test leads and clips, SD memory card, Fluke Power View and Fluke Power Analyze software, power cord with international plug set, ethernet cable, color localization set, users manual and CD
FLUKE-1750-B Three-Phase Power Recorder Basic Kit	
FLUKE 1750-TF Three-Phase Power Recorder Kit	
FLUKE-1760 Three-Phase Power Recorder	Acquisition unit, voltage and current probes (1760, 1760TR), GPS time sync receiver (1760TR, 1760TR Basic) Fluke PQ Analyze software, power cord with international plug set, ethernet cable, color localization set, users manual and CD
FLUKE-1760 Basic Three-Phase Power Recorder	
FLUKE-1760TR Three-Phase Power Recorder	
FLUKE-1760TR Basic Three-Phase Power Recorder	

In the U.S., these power quality recorders are sold exclusively through power quality representatives. To request a demonstration, or to order, call 1-888-257-9897 or email questions to [fpqsupport@fluke.com](mailto:fpqsupport@fluke.com).



## Fluke BT500 Series Battery Analyzers

**Reduced testing complexity, a simplified workflow and an intuitive user interface provide a new level of ease-of-use in battery testing**

The new Fluke BT500 Series Battery Analyzer is ideal test tool for maintenance, trouble-shooting and performance testing of individual stationary batteries and battery banks used in critical battery back-up applications. Fluke BT500 Series Battery Analyzers cover a broad range of battery test functions ranging from dc voltage and resistance tests to full condition testing using an automated string function testing and the test probe integrated infrared temperature measurement system. BT500 Series Battery Analyzers are designed for measurements on stationary batteries of all types.

- **Key measurements:** Battery resistance, dc and ac voltage, dc and ac current, ripple voltage, frequency and battery temperature
- **Sequence measurement mode:** Automatic or manual sequence testing of battery strings with automatic measurement storage including voltage, resistance and temperature (with BTL21 intelligent test probe)
- **Comprehensive logging:** All measured values are automatically captured during testing and can be reviewed on the instrument before downloading for on-the-go analysis
- **Optimized user interface:** Quick, guided setup ensures the right data is captured every time, and the combined visual and audio feedback cues reduce the risk of measurement confusion
- Safety CAT III 600 V



### Specifications

Functions	Range	Resolution	Accuracy	BT510	BT520	BT521
Battery resistance <sup>1</sup>	3 mΩ	0.001 mΩ	1% + 8	•	•	•
	30 mΩ	0.01 mΩ	0.8% + 6	•	•	•
	300 mΩ	0.1 mΩ	0.8% + 6	•	•	•
	3000 mΩ	1 mΩ	0.8% + 6	•	•	•
V dc	6 V	0.001 V	0.09% + 5	•	•	•
	60 V	0.01 V	0.09% + 5	•	•	•
	600 V	0.1 V	0.09% + 5	•	•	•
	1000 V	1 V	0.09% + 5	•	•	•
V ac (45 Hz to 500 Hz with 800 Hz filter)	600 V	0.1 V	2% + 10	•	•	•
Frequency (displayed with V ac and A ac) <sup>2</sup>	500 Hz	0.1 Hz	0.5% + 8	•	•	•
AC voltage ripple (20 KHz Max)	600 mV	0.1 mV	3% + 20	•	•	•
	6000 mV	1 mV	3% + 10	•	•	•
A dc/A ac (with accessory Fluke i410)	400 A	1 A	3.5% + 2			•
Temperature	0 °C to 60 °C	1 °C	2 °C (4 °F)			•
Meter mode	999 records for each measurement position with time stamp					
Sequence mode	Up to 100 profiles and 100 profile templates (Each profile stores up to 450 batteries) with time stamp					

<sup>1</sup>The measurement is based on AC injection method. The injected source signal is < 100 mA, 1 kHz.

<sup>2</sup>Trigger level V ac: 10 mV, A ac: 10 A.

### Ordering information

Models	Included accessories
FLUKE-BT521 Advanced Battery Analyzer	4-wire test pin (set), test lead (set), test leads with adapter, test probe set with extender and temperature sensor, ac/dc current clamp, lithium-ion battery, ac charger, mini-USB cable, shoulder strap, belt strap, magnetic hanging strap, software, soft carrying case, spare fuses (2), battery tags, and zero ohm calibration resistor
FLUKE-BT520 Battery Analyzer	4-wire test pin (set), test lead (set), test leads with adapter, test probe set with extender (no temperature sensor), lithium-ion battery, ac charger, mini-USB cable, shoulder strap, belt strap, magnetic hanging strap, software, soft carrying case, spare fuses (2), battery tags, and zero ohm calibration resistor
FLUKE-BT510 Battery Analyzer	4-wire test pin (set), test lead (set), test leads with adapter, lithium-ion battery, ac charger, mini-USB cable, shoulder strap, belt strap, magnetic hanging strap, software, soft carrying case, spare fuses (2), and zero ohm calibration resistor

Measure impedance with the Fluke BT521 Battery Analyzer.

